

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE																		
BLADDER ASSEMBLY, ITEM 110 ----- 0110-82829-13/-14 (1)	2/2	110FM05 Fails to retain position.	END ITEM: Bag out of position.	A. Design - IDB: The IDB bladder assembly is fabricated from ten (10) mil, Tuftane 410 polyurethane film. This material has an ultimate tensile strength of 5381 psi and a tear strength of 444 lb./in. Bladder material fails (failing leak test) before the adhesive bond breaks.																		
DIDB ASSEMBLY, ITEM 110 ----- 0110-110110-02 (1)		IDB: Defective Material: Adhesive, Velcro.	GFE INTERFACE: Unable to provide crewman with potable water.	The disposable IDB bladder assembly is fabricated from a 4.5 mil. Polyethylene/nylon laminate. This laminate has a yield strength of 6124 lb/sq.in. and a tear propagation of 0.4 lb. (machine direction) and 0.91 (transverse direction).																		
OR ----- 0110-110110-01 (1)		DIDB: Defective Material; bladder film.	MISSION: Terminate EVA. CREW/VEHICLE: Crewmember dehydration.	The DIDB is located within its restraint in two ways. The bag is hung on two fabric hooks located at the top of the restraint, which mate with holes in the heat seal seam allowance of the bladder. In addition, the "winged" shape of the bladder locates the bladder within the restraint and deters the bladder from slipping down completely into the restraint should the hook attachments fail.																		
DIDB TUBING SUB ASSEMBLY ----- 0110-812729-02 (1)			TIME TO EFFECT /ACTIONS: Minutes. TIME AVAILABLE: N/A TIME REQUIRED: N/A	B. Test - Acceptance: Acceptance of all material is performed prior to manufacturing. Heat seal samples are tensile tested in production to ensure structural integrity of the heat seal. PDA: The following tests are conducted at the IDB assembly level in accordance with ILC Document 0111-70028J (IDB) or 0111-710112 (DIDB): 1. Visual inspections for quality of workmanship, apparent damage, wear. 2. Inspected for visible cleanliness and fabric degradation.																		
		REDUNDANCY SCREENS: A-N/A B-N/A C-N/A		Certification: 0110-82829-13/14: The following usage, reflecting requirements of significance to the IDB, was documented during certification: The IDB was tested to the S/AD requirement of 144 cycles to achieve the 6-year operational usage. DIDB Assembly: The DIDB was successfully tested (manned) during certification to duplicate a single usage (with safety factor). (Ref. Cert. Test Report for the DIDB, ILC Doc. 0111-712763). The DIDB assembly successfully passed S/AD requirements including 200 installations/removals of the bladder from the restraint bag.																		
				<table border="1"> <thead> <tr> <th>Requirements</th> <th>S/AD</th> <th>ACTUAL</th> </tr> <tr> <th>-----</th> <th>----</th> <th>-----</th> </tr> </thead> <tbody> <tr> <td>Fill Cycles (using water)</td> <td>1</td> <td>2</td> </tr> <tr> <td>Drain cycles (Bite Valve Actuation)</td> <td>32</td> <td>64</td> </tr> <tr> <td>Installation/Removal into Restraint</td> <td>1</td> <td>2</td> </tr> <tr> <td>Don/Doff</td> <td>1</td> <td>2</td> </tr> </tbody> </table>	Requirements	S/AD	ACTUAL	-----	----	-----	Fill Cycles (using water)	1	2	Drain cycles (Bite Valve Actuation)	32	64	Installation/Removal into Restraint	1	2	Don/Doff	1	2
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				C. Inspection - (All bladder Assemblies) Components and material manufactured to ILC requirements at an approved supplier are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the materials received are as identified in the procurement documents, that no damage has occurred during shipment and that																		

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		110FM05		<p>supplier certifications have been received which provide traceability information.</p> <p>Velcro positioning on the IDB and DIDB restraint is visually checked during in-line inspection during the manufacturing process. Seam samples from the DIDB are tested to a minimum peel strength of 12 lb/in.</p> <p>PDA: During PDA, the following MIPS are performed at the IDB and DIDB assembly level in accordance with ILC Document 0111-70028J (IDB) or 0111-710112 (DIDB). 1. Visual inspection for material degradation or damage.</p> <p>D. Failure History - IDB: EMU-110-001 (12/9/77) - Velcro peeled off the IDB bag during examination prior to donning. A close examination indicated that the polyurethane had not been penetrated by the adhesive. P/N 0110-10010-01 was revised to include priming with THF. I-EMU-110-A002 (12/5/89) - The Velcro was debonded from the bladder assembly in several areas. Most probable cause was improper cleaning and lack of primer prior to applying adhesive. Per ECO 902-0249, the IDB Bladder Assembly table of operations was revised. I-EMU-110-A006 (10/7/92) - Velcro debonded from bladder assembly. Cause was unknown since the failed condition could not be duplicated. No corrective action taken. B-EMU-110-T002 (6/13/96) - Velcro hook was not bonded to the bladder. The condition could not be replicated through test or a cause determined by analysis. No corrective action taken.</p> <p>DIDB: None.</p> <p>E. Ground Turnaround - During ground turnaround, in accordance with FEMU-R-001, the IDB and DIDB restraint are subjected to visual inspection for material damage or degradation. The DIDB bladders are not subjected to ground turnaround since they are disposable items.</p> <p>F. Operational Use - Crew Response: Pre/Post EVA: Troubleshoot problem. If no success, replace IDB/didb. If no replacement available, EMU no-go for EVA. EVA: Terminate EVA.</p> <p>Special Training: Standard EMU training covers this failure mode.</p> <p>Operational Considerations - Generic EVA Checklist, JSC-48023, procedures Section 3 (EMU Checkout) and 4 (EVA prep) verify hardware integrity and systems operational status prior to EVA.</p>

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110FM05

Real Time Data System allows ground monitoring of EMU systems.

EXTRAVEHICULAR MOBILITY UNIT
 SYSTEMS SAFETY REVIEW PANEL REVIEW
 FOR THE
 I-110 IN-SUIT DRINK BAG (IDB)
 CRITICAL ITEM LIST (CIL)
 EMU CONTRACT NO. NAS 9-97150

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